Armed Forces College of Medicine

AFCM

Effector T helper cells

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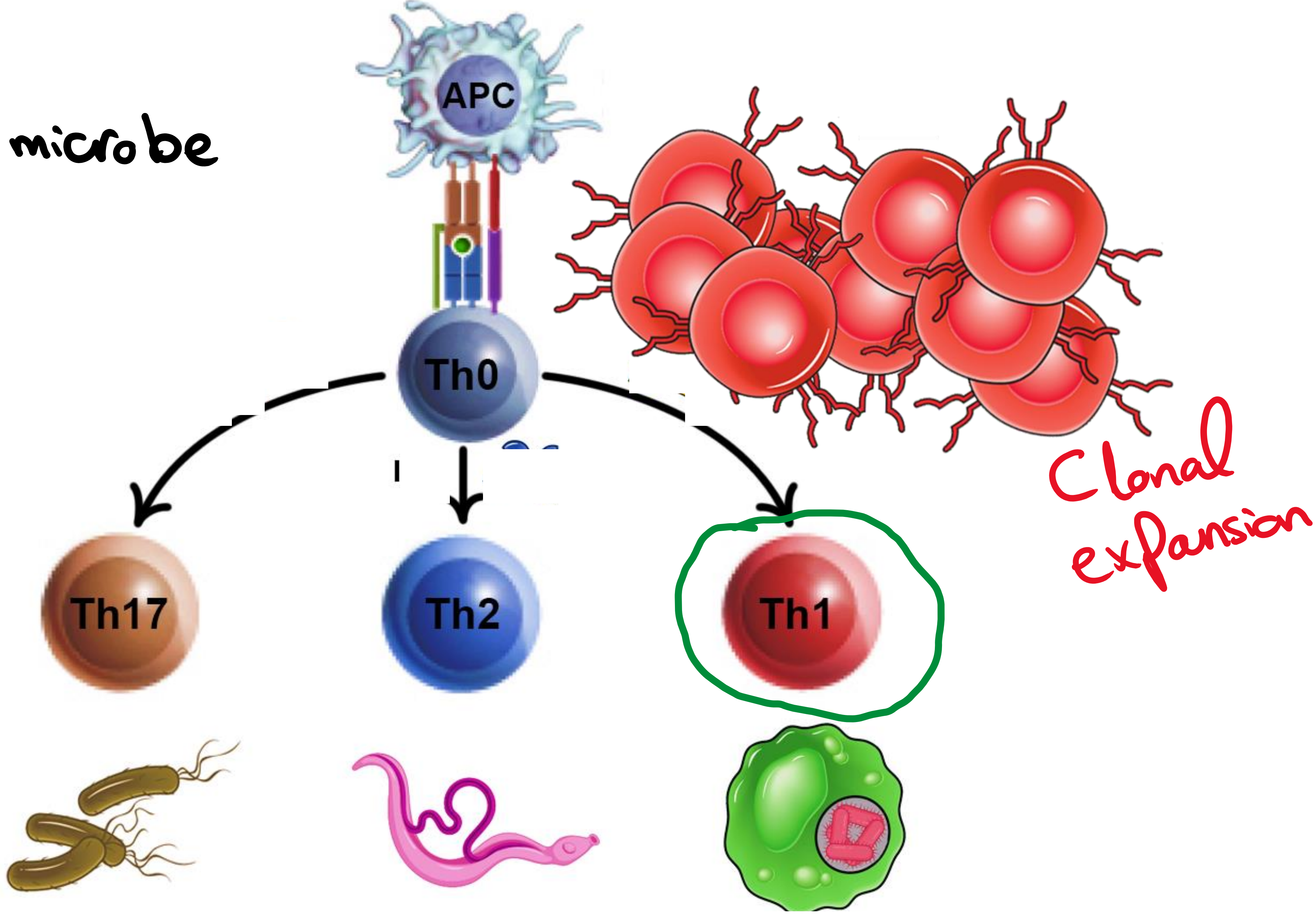
INTENDED LEARNING OBJECTIVES (ILO)

By the end of this session the student will be able to:

1-Describe T helper subsets and its effector functions

2- Discuss functions Antigen presenting cells

Type of microbe



Clonal expansion

Extracellular bacteria & fungi

Helminths

Intracellular microbes

Th1

Formation

In response to **IC bacteria & viruses by** :

IL-12 produced from **macrophages & dendritic cells**

Main role

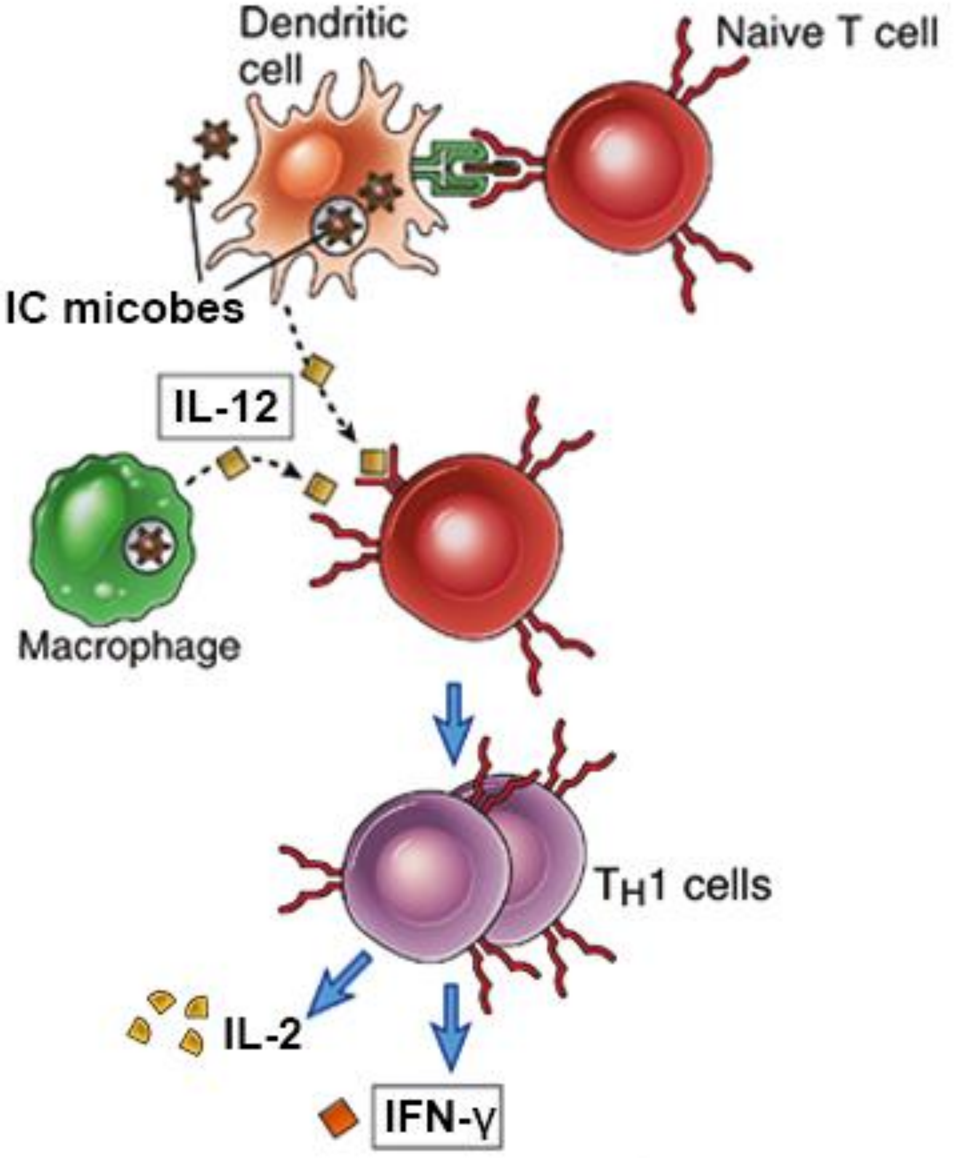
Immunity against

A-IC bacteria & fungi ,

B- Viruses

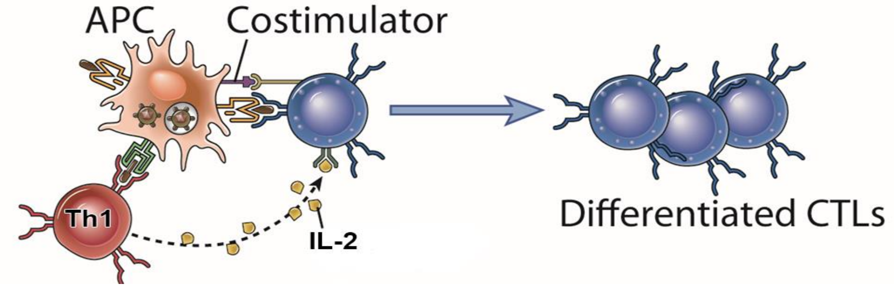
Cytokines produced

IFN γ & **IL2**



Th1

Effector functions

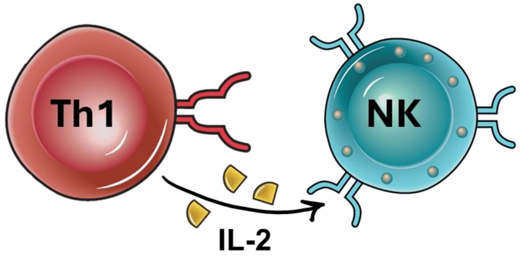


1 **Activation of MQ to kill phagocytosed IC bacteria:**

by **IFN γ** (the most potent stimulator of MQ)

a) ↑ lysosomal proteases ,reactive O2 species

b) ↑ MHC expression & costimulators → ↑ Ag presentation



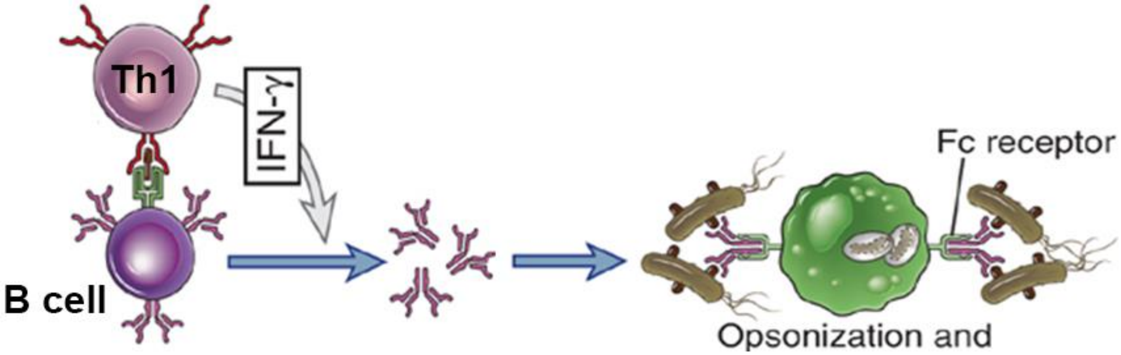
2 **Growth & Activation of Th (CD4) & Tc (CD8):** By **IL2** (T cell growth factor)

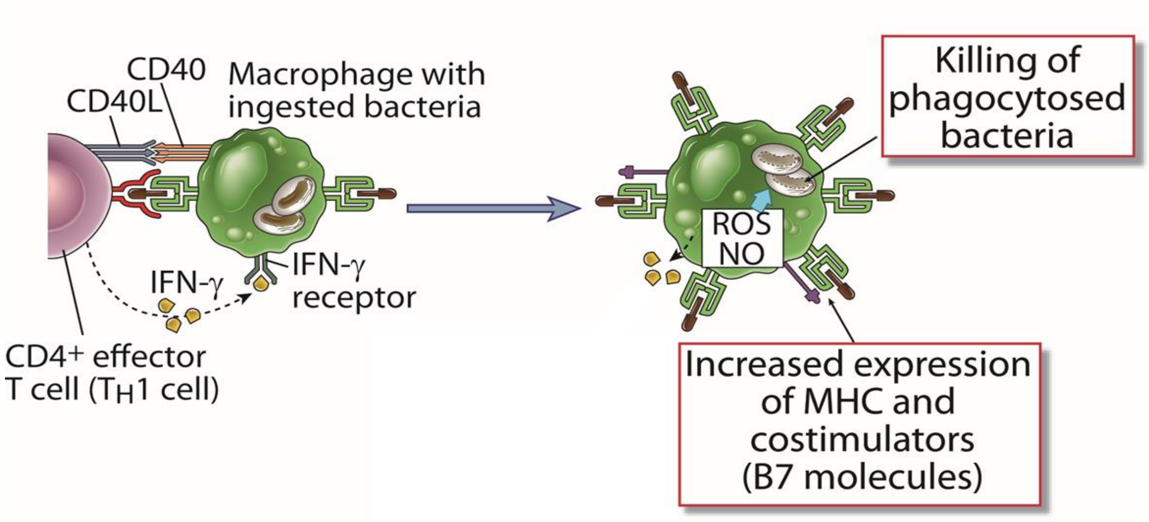
3 **Activation of NK cells:** By **IL2**

4 **Activation of B cells to produce IgG :** By **IFN γ**

↓

Enhance phagocytosis by MQ (opsonizing Ab)




CD40
CD40L
Macrophage with ingested bacteria
IFN-γ
IFN-γ receptor
CD4+ effector T cell (TH1 cell)
Killing of phagocytosed bacteria
ROS
NO
Increased expression of MHC and costimulators (B7 molecules)

Th1

Effector functions

Th1

IC microbes (by IL12)

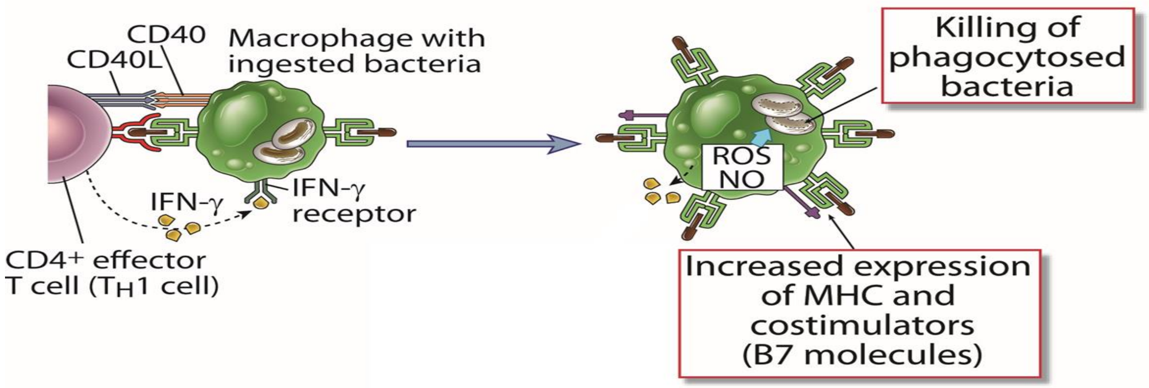
- **2 Cytokines :**

IFNγ & IL2

- **4 cells : MQ (strongest) ,**

NK ,T & B

- **1 Ab : IgG**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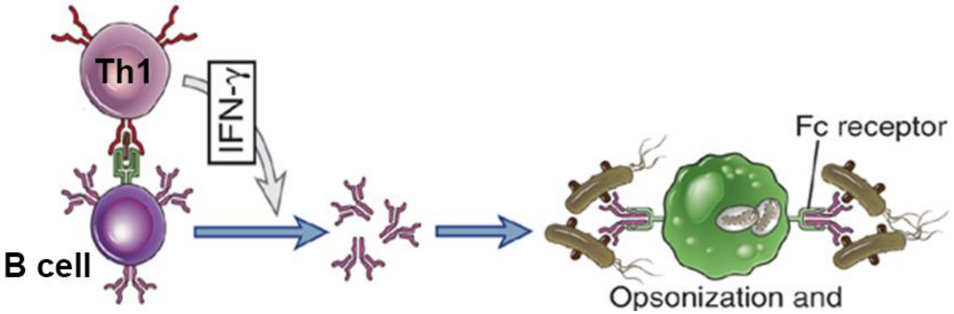
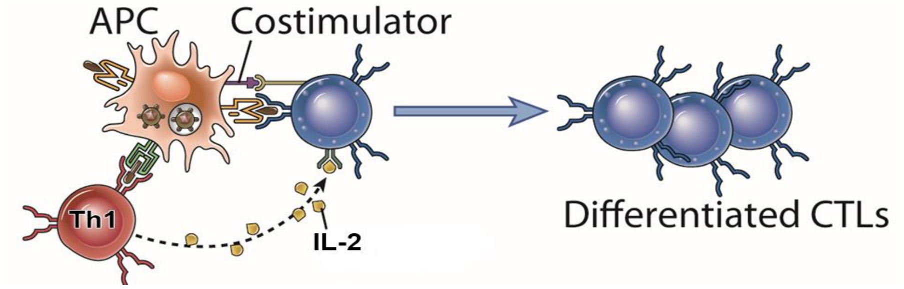
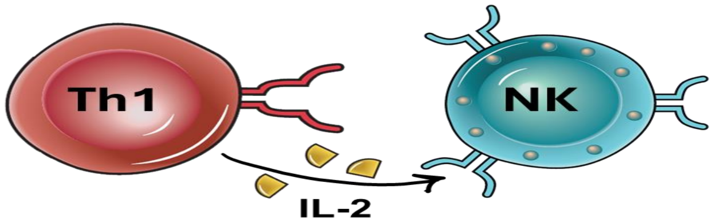






Quiz

Which of the followings is a function of IFNγ?

a. ↓ expression of MHC I & II on MQ

b. Stimulates neutrophils

c. ↑ cidal activity of MQ

d. ↑ IgM production by B cells

e. Stimulates eosinophils

C

Th2

Formation

In response to **helminths (parasites) by** :

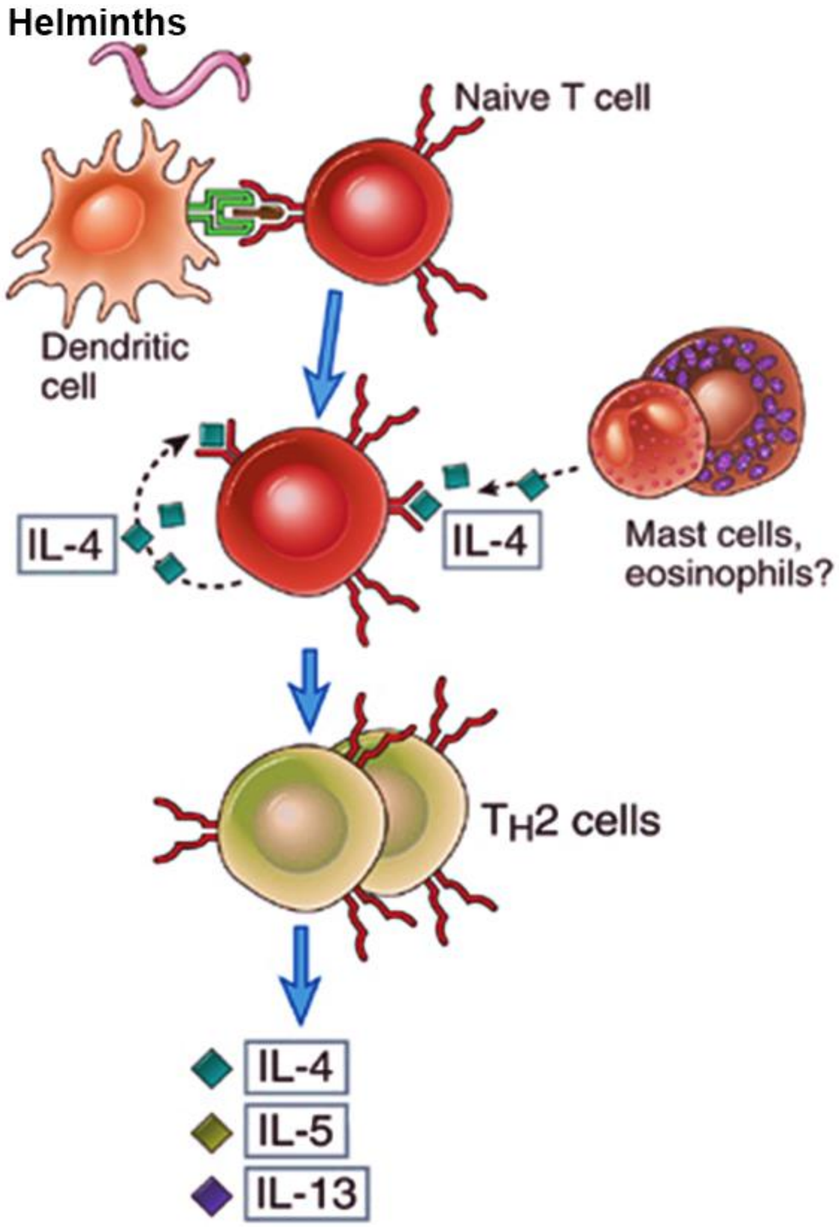
IL-4 produced from **mast cells**

Main role

Immunity against **helminthic infections**

Cytokines produced

IL-4, 5, & 13



Th2

Effector functions

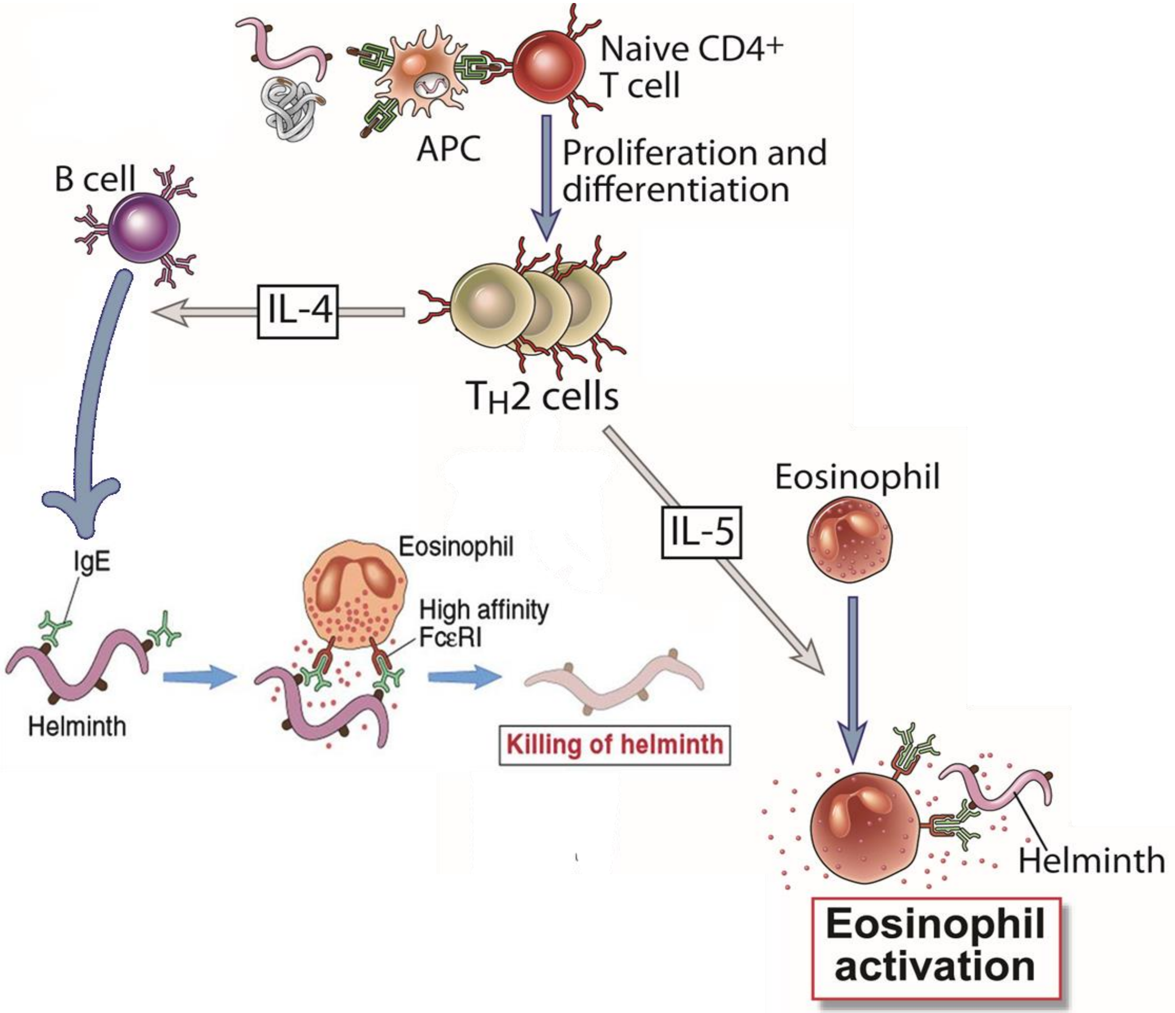
1 **Activation of eosinophils to kill helminths (Cytotoxicity):** by **IL-5**

2 **Activation of B cells to produce IgE:** by **IL-4 & 13**

↓

Ab dependent cellular cytotoxicity (ADCC)

of parasites by **eosinophils**



Th2

- **Helminths**
- **2 cells: Eosinophils (strongest) & B cell**
- **3 Cytokines : IL4 , 5 &13**
- **1Ab : IgE**

Th17

Formation

In response to **extracellular bacteria & fungi by** :

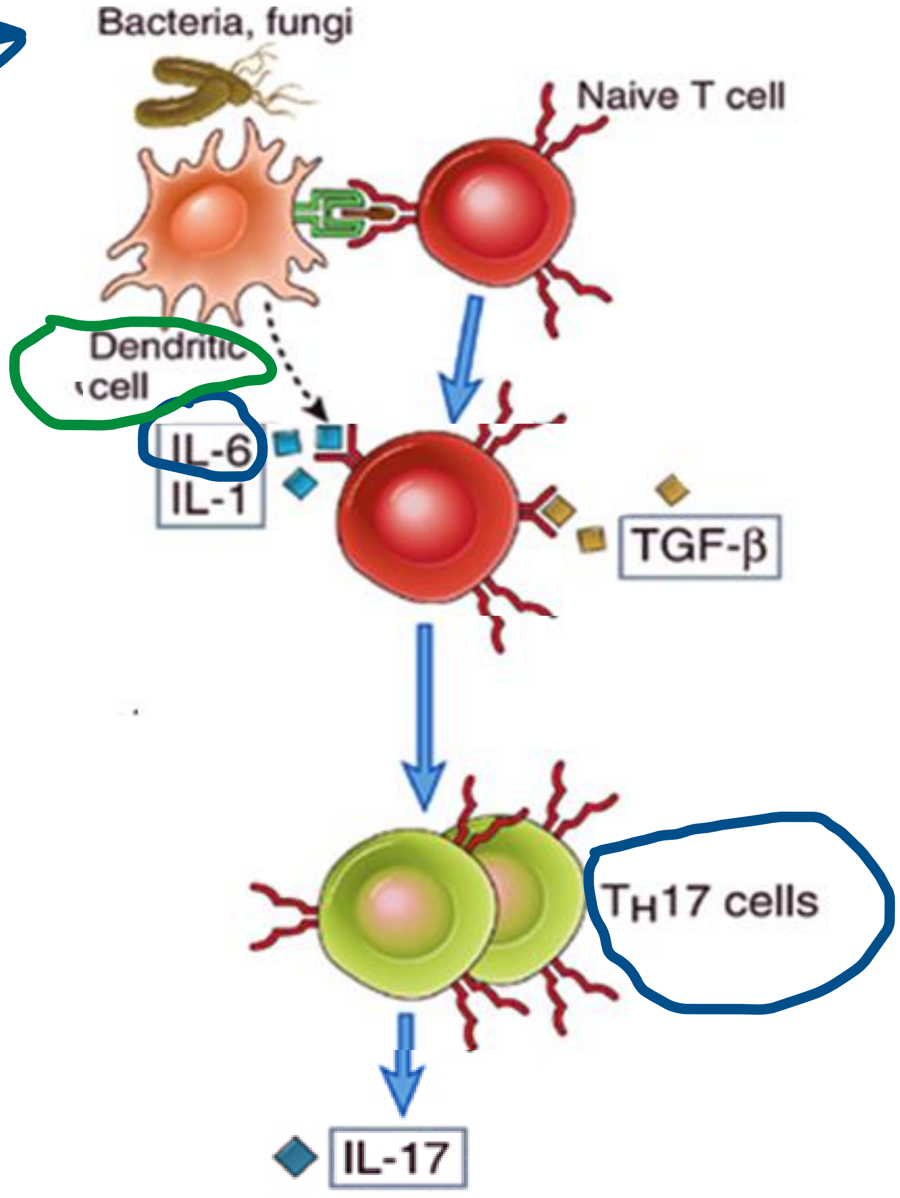
IL-6 (proinflammatory cytokine)

Main role

Immunity against **extracellular bacteria & fungi**

Cytokines produced

IL-17



Th17

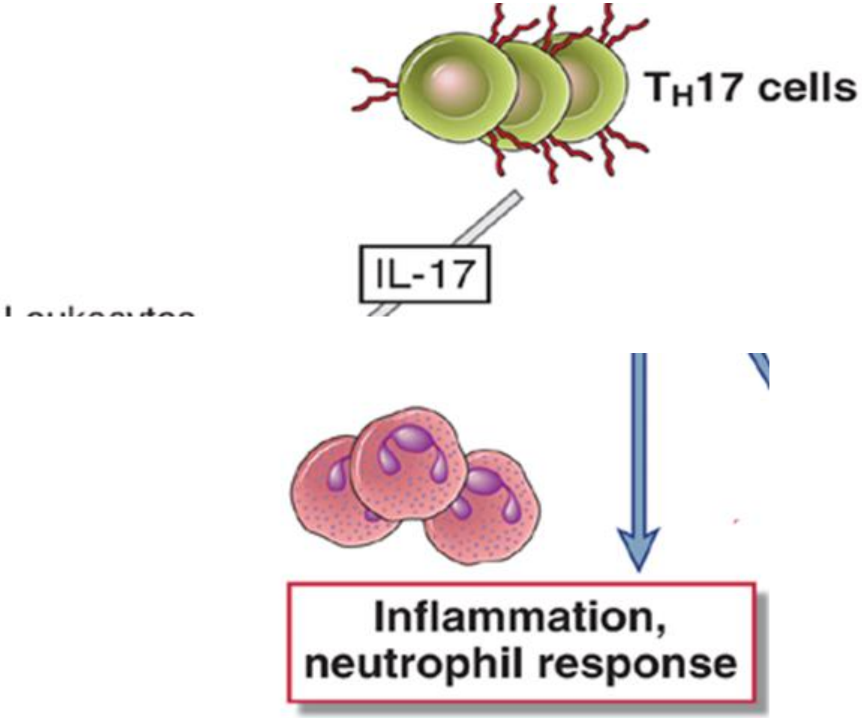
Effector functions

1 Recruitment of neutrophils to site of infection **by IL17**

↓

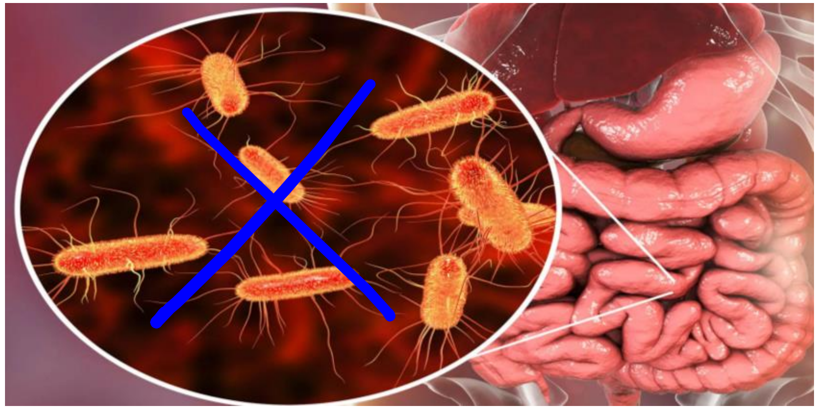
Inflammation

to destroy extracellular bacteria & fungi



2 Protect against spread of bacterial infection

at GIT mucosa



Gastrointestinal tract

Quiz 2

- **Which of the following immune cells is induced by IL6?**

A. Th1

B. Th2

C. Th17

D. CTL

E. Plasma cell

C